

## Thermal comfort differences between polycarbonate and opaque roofing material installed in bus stations of Malaysia

### Abstract

Bus shelter as a semi-outdoor space protects individuals from direct sun light, rain and wind. The roofing material of busstop has extreme influence on environmental and subjective conditions of persons within this space. In this study, the principal concentration is distinguishing the differences between installation of Polycarbonate plastic roofing material and that of opaque protection cover as two widespread roofing materials in obtaining human thermal comfort in equatorial climate of Malaysia. Hence, two bus stops, one covered by Polycarbonate translucent plastic and one with opaque concrete-based tile, were selected to evaluate their inner thermal comfort condition by measurement of four main microclimatic parameters (i.e. air temperature, wind velocity, humidity and mean radiant temperature) as well as subjective survey in a university campus using the Physiological Equivalent Temperature (PET) as thermal index. The study found that the Polycarbonate roofing material is not appropriate material for permanence in bus shelters of Malaysia neither objectively nor subjectively comparing with opaque protective cover. Additionally, it was revealed adoption greatly impacts individual thermal perception which should not be neglected in the examination of thermal comfort in non-indoor spaces.

**Keyword:** Human thermal comfort; Roofing materials; Adaption; PET.